Forest Health Protection
Pacific Southwest Region

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To: Sharon Heywood, Forest Supervisor, Shasta-Trinity National Forest

Subject: Biological Evaluation of Mt. Shasta winter breakage – Mt. Shasta Ranger District (FHP Report No. N10-009)

The SMMU (Shasta-McCloud Management Unit) suffered an extreme amount of snow breakage caused by the storms of January 2010 on the Mt. Shasta side of the district. There are now hundreds of acres of contiguous plantations across the landscape with broken, dead, down and dying conifers. On July 22, 2010, Cynthia Snyder (Entomologist) of Forest Health Protection, accompanied by Eve Vardanega (Silviculture – SMUU), visited SMMU to provide input on the increased risk of bark beetle infestation following the storm breakage.

Observations and recommendations for the area are as follows:

Mt. Shasta Plantations
Plantations around the City of Mt. Shasta are mostly 30-40 years old, larger diameter ponderosa pine, 6-14 inch DBH (ave. 10 inches), in overstocked situations. Ongoing drought has created conditions favorable for increasing western pine beetle populations: dense, nearly monoculture stands of larger diameter host species under water stress. There are currently thousands of susceptible acres under imminent threat of bark beetle attack (Figures 1 and 2).

Figure 1. View of contiguous plantations around the City of Mt. Shasta.

Figure 2. View of plantations with Mt. Shasta in the background.

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Much of the storm breakage is in 8-16 inches DBH pines with the break between 4 and 20 feet high. Western pine beetle has been active in the area with small mortality pockets scattered across the landscape. In one stand we visited, there were 15-20 dead pines 10-14 inches DBH with evidence of ambrosia beetles entering the dead trees. Currently green trees with pitch outs and successful attacks can be found scattered around the pocket of western pine beetle-caused mortality. In another stand 20+ pines were killed by western pine beetle. The stand was overly dense with 200-250 TPA.

Figure 3. Storm damage in western pine beetle mortality pocket.

Figure 4. Broken tops of ponderosa pines scattered around stand infested with western pine beetle.

SMMU has been carrying out a long-term thinning and mastication of the plantations surrounding Mt. Shasta. Mastication of trees less than 14 inches DBH has been carried out using ARRA and WF funds. Trees less than 8 inches in diameter are being thinned to 16-20 foot spacing with a residual BA of 60-120 sq.ft./ac. The TSI department at SMMU has been working under an LOP (limited operating period) that requires that precommercial thinning not start until after July 15th, to reduce the potential for beetle infestation. This LOP is necessary when precommercially thinning plantations with chainsaws leaving large conifer material on the ground that could provide a brood site for Ips. I suggested eliminating the LOP in this case where, after mastication, the slash remaining on the ground is similar to mulch, very small, shredded pieces that are usually less than 3 x 3 inches in size, and not suitable host material for beetle infestation.

Figure 5. Overly dense stands susceptible to western pine beetle.

Figure 6. Western pine beetle caused mortality in ponderosa pine.

The issue with masticated material being left prior to the July LOP date is the possibility of Ips getting into the standing trees. Although the masticated material will release a plume of terpenes that will be very attractive to Ips species for a number of days after mastication occurs (probably

on the order of 10-14 days), the damaged trees provide the much needed stressed host material needed for western pine beetle to produce adequate brood to cause a much larger epidemic.

The annual precipitation of 2010 was much more normal than the past few years. As long as nearly normal conditions prevail (within 75% of normal precipitation), the residual trees may be able to provide an adequate defense against the beetles. If drought conditions return in 2011, the brood produced in the stressed broken tress may be able to start an epidemic that would devastate thousands of acres surrounding the City of Mt. Shasta. Under the current situation with the amount of accumulated material from the snow-breakage, I suggest that getting in earlier to take care of the material would be better than leaving it for beetles to infest and produce brood.

The thinning and mastication of the plantations would also reduce the risk of wildfire around Mt. Shasta. The increased fuel load prompted the use of WF funds to continue mastication when contractors requested more money to address the breakage. The resulting stands will be less dense with spacing between 16 and 20 feet. This will make residual trees more resilient to drought conditions.

Supporting Details	
Forest Type	Plantations
Location	WUI – City of Mt. Shasta
Landscape Treatment	Mastication underway
Proposed Treatment	
NEPA	
Proposed Acres	
Requested Funding	
Total Cost Per Acre	
Matching Funding	
Species Composition	PP, with some ingrowth of WF, IC, DF
Current Diameters	6-16 inches DBH
Residual Diameters	14+ inches DBH
Current Stocking	200-250 TPA
Target Stocking	
Agents of Concern	*D. brevicomis, D. ponderosae, Ips pini*
Recent Activity	*D. brevicomis* in pockets up to 1 acre in size
Current Susceptibility	High to Imminent

Summary

Current mastication treatments will reduce the attractiveness of the treated stands to Ips beetles over the long term. However, treatment by mastication of down material will not be totally effective in addressing current concerns regarding bark beetles because it does not address the current population build-up in the standing trees. Current thinning operations will reduce bark beetle risk and meet the Regional Forester's density management policy that high risk density levels will not be reached again for at least 20 years. However, thinning must continue throughout these plantations to reduce stand densities, with highest risk stands (those with highest percentage of broken material and/or those with current bark beetle mortality) being addressed first. As thinning and mastication progresses, the Forest should remove all dead and dying pines, including green trees with successful bark beetle attacks, in these plantations.

If you have any questions regarding this report and/or need additional information please contact Cynthia Snyder at 530-226-2437 or Pete Angwin at 530-226-2436.

/s/ Cynthia Snyder

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References:

Oliver, W. W. 1995. Is self-thinning in ponderosa pine ruled by Dendroctonus bark beetles? Proceedings of the 1995 National Silviculture Workshop, May 18–21, Mescalero, New Mexico, 21213–18. General Technical Report RM-GTR-267. Fort Collins, CO: U.S. Forest Service.